BRISTOL BAY DATA REPORT NO. 85-7

Nushagak River Chinook Salmon (O. tshawytscha)

Sport Fish Monitoring Program

1982 and 1984

By

R. Eric Minard

and

Steven P. Morstad
Fisheries Biologists

Alaska Department of Fish and Game
Division of Commercial Fisheries
Dillingham, Alaska

April, 1985

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

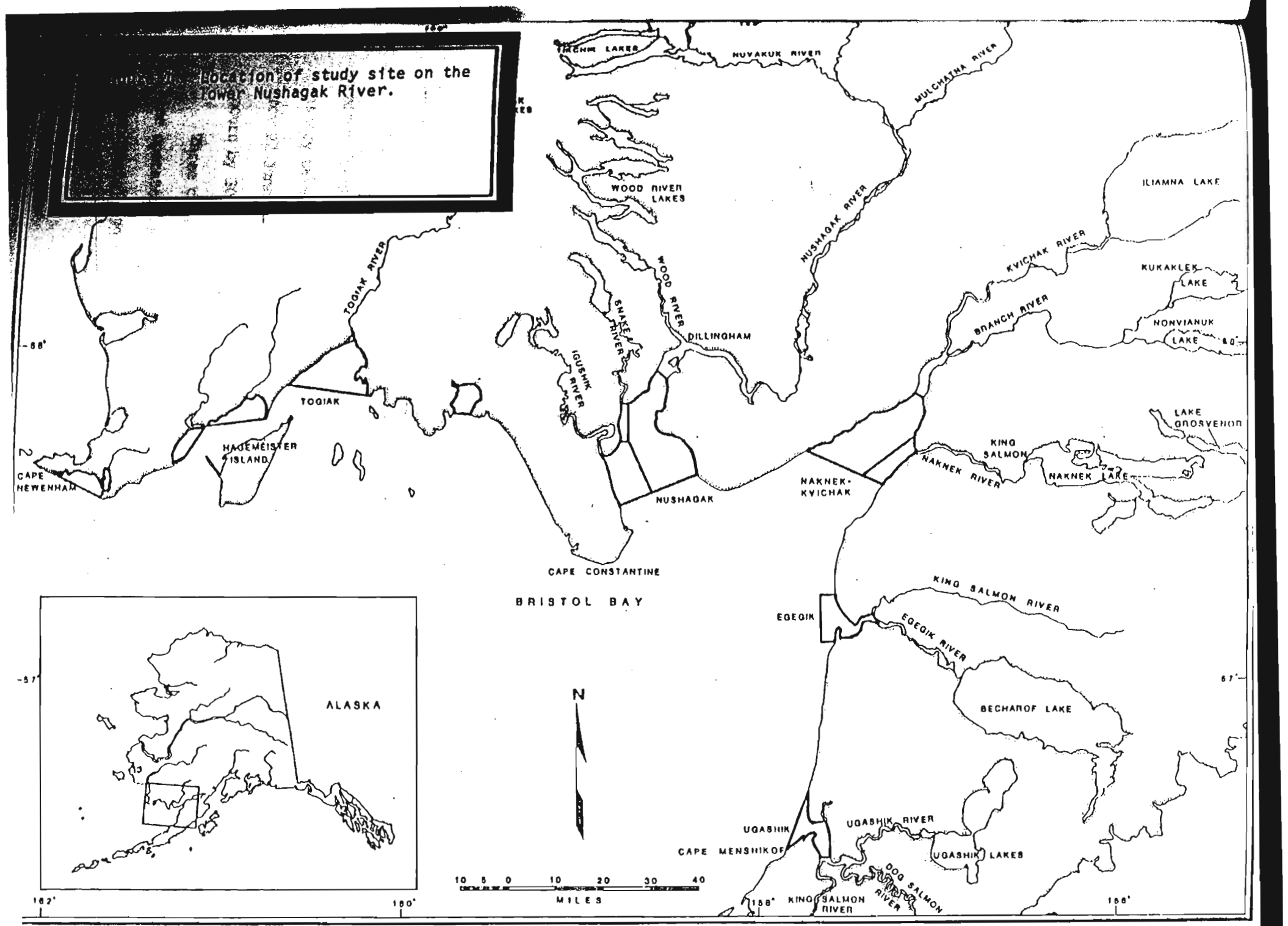
INTRODUCTION

Chinook salmon (Onchornynchus tshawytscha) returns to the Nushagak River (Figure 1) typically account for about 72 percent of the Bristol Bay production. Since 1975 commercial landings have averaged 110,000 fish annually. Keeping pace with the commercial fishing interests, a rapidly developing sportfishery has discovered the lower Nushagak River as a source of chinook salmon unequaled by any other system in Bristol Bay.

The Division of Commercial Fisheries has operated a side scan sonar adult salmon enumeration program on the lower Nushagak River, near the village of Portage Creek, since 1979. The camp location and project tenure (early June until mid-August) made for an optimal situation to begin collection of catch and effort data associated with the Nushagak River chinook salmon sportfishery incidental to duties already being conducted. Contact with Mr. Louis Gwartney, Area Sportfish Biologist, and Regional Sportfish Supervisor Russell Redick in 1982 help set the groundwork and objectives for the study. A sportfish survey directed toward Nushagak River chinook salmon program was initiated in 1982 and run again in 1984. Specific project objectives were to: (1) document sport-fishing effort directed toward chinook salmon on the lower Nushagak River by commercial operators and their clients; (2) collect catch statistics from the documented effort; and (3) define the timing of the sportfishery taking place on the lower Nushagak River.

METHODS

A sportfish questionnaire was distributed to as many of the commercial operators and guides as could be contacted on the river by the sonar crew. Compliance was voluntary with participating guides being asked to document the number of fishermen and hours fished by date as well as the numbers of fish [illegible] caught and released as well as those caught and kept. Questionnaires


Location of study site on the
Lower Nushagak River.
TIKCHIK LAKES
NUVAKUK RIVER
MULCHATNA RIVER
WOOD RIVER LAKES
NUSHAGAK RIVER
ILIAMNA LAKE
KVICHAK RIVER
KUKAKLEK LAKE
BRANCH RIVER
NONVIANUK LAKE
WOOD RIVER
SNAKE RIVER
IGUSHIK RIVER
DILLINGHAM
TOGIAK RIVER
TOGIAK
HAGEMEISTER ISLAND
CAPE NEWENHAM
NUSHAGAK
NAKNEK-KVICHAK
LAKE GROSVENOR
KING SALMON
NAKNEK RIVER
NAKNEK LAKE
CAPE CONSTANTINE
BRISTOL BAY
KING SALMON RIVER
EGEGIK
EGEGIK RIVER
BECHAROF LAKE
ALASKA
N
UGASHIK
UGASHIK RIVER
CAPE MENSHIKOF
UGASHIK LAKES
DOG SALMON RIVER
KING SALMON RIVER
10 5 0 10 20 30 40
MILES
162°
160°
158°
58°
57°

were left with participating guides and were collected at the end of the season. Periodic contact by Department personnel aided the proper administration of the questionnaires and helped improve the response rate among the operators.

Data were collected by Commercial Fisheries personnel on an "as available" basis and represent minimal estimates since most, but not all, commercial operations were included and no private fishermen were involved. Post-seasonally, catch and effort statistics were summarized from questionnaires using the LOTUS-123 software package on a micro-computer.

RESULTS

Commercial Guide Participation

Chinook salmon sportfish catches on the lower Nushagak River were monitored from 6/13 to 7/17 in 1982 and 6/16 to 7/26 in 1984. Three commercial operators chose to participate in the survey in 1982 with nine participating in 1984. The exact proportion of commercial operators that use the lower Nushagak and did comply with the survey is unknown. It is likely, however, that the majority participated in the survey program in 1984. Table 1 lists guiding services that participated in the survey program.

Fishery Timing and Effort

The two years of survey data suggest that the timing and entry pattern of chinook salmon into the lower Nushagak River is somewhat regular. The sport-fishery takes place from mid-June until mid-July with peak catches occurring from 22 June through 26 June. Fifty percent of the season's catch typically occurs by 30 June (Table 2, Figure 2, Table 3, Figure 3).

Three commercial operators accounted for 296 angler days in 1982 while nine operators accounted for 749 angler days in 1984. These data translate into approximately 99 and 83 angler days per operator in 1982 and 1984, respectively.

Table 1. Commercial sportfishing operators and fishing effort in angler days for 1982 and 1984.

GUIDE SERVICE	FISHING EFFORT (Angler Days) 1982	1984
ALASKA RAINBOW LODGE	NA	14
ALASKA RAINBOW UNLIMITED	NA	22
ALASKA WILDERNESS LODGE	NA	20
BRISTOL BAY LODGE	52	60
GOLDEN HORN LODGE	204	300
FISHING UNLIMITED	NA	124
KATMAI LODGE	NA	25
ROYAL COACHMAN LODGE	NA	89
TIKCHIK NARROWS	40	95
TOTALS	296	749

Table 2. Chinook Salmon sportfish catches by day for participating commercial operators on the Lower-Nushagak River, 1982.

DATE	FISH RELEASED	FISH KEPT	TOTAL CATCH	ACCUM	PERCENT ACCUM
13-Jun	0	0	0	0	0.00
14-Jun	0	0	0	0	0.00
15-Jun	0	1	1	1	0.10
16-Jun	0	0	0	1	0.10
17-Jun	0	0	0	1	0.10
18-Jun	0	0	0	1	0.10
19-Jun	0	0	0	1	0.10
20-Jun	0	3	3	4	0.42
21-Jun	2	15	17	21	2.19
22-Jun	47	75	122	143	14.88
23-Jun	49	39	88	231	24.04
24-Jun	14	20	34	265	27.58
25-Jun	35	5	40	305	31.74
26-Jun	46	10	56	361	37.57
27-Jun	14	47	61	422	43.91
28-Jun	3	8	11	433	45.06
29-Jun	16	6	22	455	47.35
30-Jun	40	20	60	515	53.59
01-Jul	25	8	33	548	57.02
02-Jul	50	5	55	603	62.75
03-Jul	5	5	10	613	63.79
04-Jul	20	20	40	653	67.95
05-Jul	60	20	80	733	76.27
06-Jul	50	10	60	793	82.52
07-Jul	40	15	55	848	88.24
08-Jul	23	0	23	871	90.63
09-Jul	20	0	20	891	92.72
10-Jul	24	0	24	915	95.21
11-Jul	14	16	30	945	98.34
12-Jul	8	8	16	961	100.00
TOTAL	605	356	961		
PERCENT	63%	37%			

Figure 2. Chinook salmon sportfish catch by day on the lower Nushagak River, 1982.

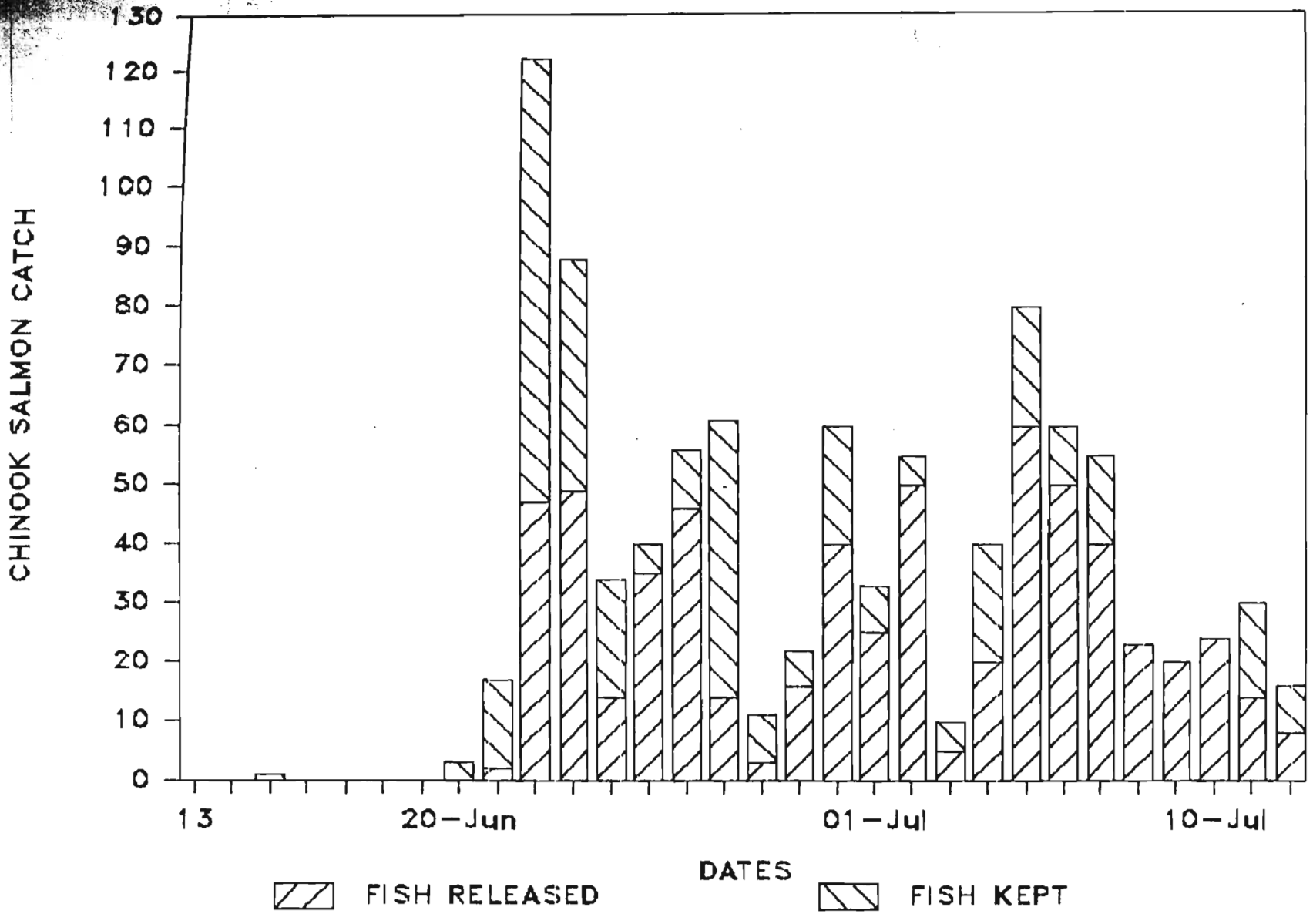
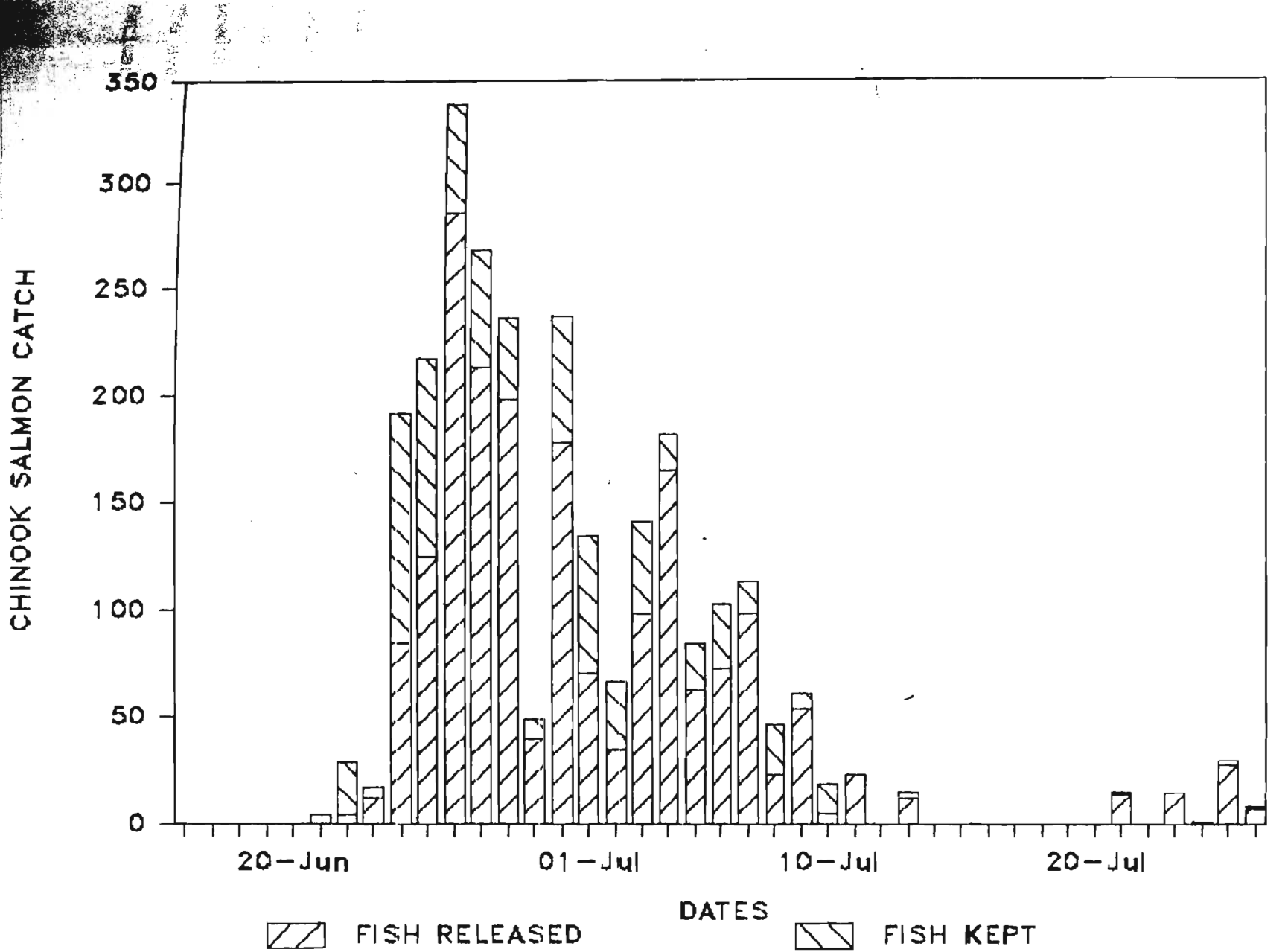


Table 3. Chinook Salmon sportfish catches by day for participating commerical operators on the Lower-Nushagak River, 1984.

DATE	FISH RELEASED	FISH KEPT	TOTAL CATCH	ACCUM	PERCENT ACCUM
16-Jun	0	0	0	0	0.00
17-Jun	0	0	0	0	0.00
18-Jun	0	0	0	0	0.00
19-Jun	0	0	0	0	0.00
20-Jun	0	0	0	0	0.00
21-Jun	0	4	4	4	0.15
22-Jun	4	25	29	33	1.24
23-Jun	12	5	17	50	1.88
24-Jun	85	107	192	242	9.12
25-Jun	125	93	218	460	17.33
26-Jun	286	52	338	798	30.07
27-Jun	214	55	269	1067	40.20
28-Jun	199	38	237	1304	49.13
29-Jun	40	9	49	1353	50.98
30-Jun	179	59	238	1591	59.95
01-Jul	71	64	135	1726	65.03
02-Jul	35	32	67	1793	67.56
03-Jul	99	43	142	1935	72.91
04-Jul	166	17	183	2118	79.80
05-Jul	63	22	85	2203	83.01
06-Jul	73	30	103	2306	86.89
07-Jul	99	15	114	2420	91.18
08-Jul	23	24	47	2467	92.95
09-Jul	54	7	61	2528	95.25
10-Jul	5	14	19	2547	95.97
11-Jul	23	0	23	2570	96.83
13-Jul	12	3	15	2585	97.40
21-Jul	14	1	15	2600	97.97
23-Jul	15	0	15	2615	98.53
24-Jul	1	0	1	2616	98.57
25-Jul	28	2	30	2646	99.70
26-Jul	7	1	8	2654	100.00
TOTAL	1932	722	2654		
PERCENT	73%	27%			

Figure 3. Chinook salmon sportfish catch by day on the lower Nushagak River, 1984.



Catch Rates

Catch statistics reported by commercial guides indicated that 63% of the 961 chinook salmon landed in 1982 were released while 37% were killed and kept. Similar data in 1984 put these proportions at 73% released and 27% killed of the 1,932 fish caught (Table 2 and 3). Catch estimates are undoubtedly conservative as they address only those commercial operators who chose to participate in the survey and do not include catches from private, non-guided fishermen.

Over the course of the two seasons, catch rates averaged 42.04 and 39.25 fish per 100 angler hours for 1982 and 1984, respectively. Peak catch rates occurred on 29 June in both years and ranged between 125 to 127 fish per 100 angler hours (Tables 4 and 5). Figures 4 and 5 illustrate catch indices measured as fish per 100 angler hours for the two survey years.

DISCUSSION

The chinook salmon sportfishery occurring on the lower Nushagak River is expanding at an undetermined rate. Catch and effort data for 1982 and 1984 suggests that catch rates have remained static, and that run timing and entry pattern may possibly be regular between years.

Further analysis of the catch data suggests that approximately a third of the chinook salmon landed by professionally guided sportfishermen are killed and kept with the remainder being released. No estimates of total harvest are possible however, because exact sampling proportions are unknown. One of the interesting derivatives of this study was the defining of run timing for Nushagak River chinook salmon. The apparent regularity in entry pattern may possibly be of predictive value if sportfishing catch rates can be correlated with escapement. The average percent accumulated catch for both years is shown in Figure 6. Estimates of final sportfish harvest could possibly be projected from this

Table 4. Chinook Salmon sportfish catch per unit effort data collected from commerical operators on the Lower-Nushagak River, 1982.

DATE	NUMBER OF FISHERMAN	HOURS FISHED	FISH RELEASED	FISH KEPT	TOTAL CATCH	CATCH PER UNIT EFFORT 1/
13-Jun	4	12	0	0	0	0.00
14-Jun	1	2	0	0	0	0.00
15-Jun	5	20	0	1	1	5.00
16-Jun	10	30	0	0	0	0.00
17-Jun	10	65	0	0	0	0.00
18-Jun	3	6	0	0	0	0.00
19-Jun	0	0	0	0	0	0.00
20-Jun	10	44	0	3	3	6.82
21-Jun	5	30	2	15	17	56.67
22-Jun	31	226	47	75	122	53.98
23-Jun	25	172	49	39	88	51.16
24-Jun	18	116	14	20	34	29.31
25-Jun	8	57	35	5	40	70.80
26-Jun	11	78	46	10	56	71.79
27-Jun	29	191	14	47	61	31.94
28-Jun	5	30	3	8	11	36.67
29-Jun	5	18	16	6	22	125.71
30-Jun	16	176	40	20	60	34.09
01-Jul	10	70	25	8	33	47.14
02-Jul	12	126	50	5	55	43.65
03-Jul	6	21	5	5	10	47.62
04-Jul	15	120	20	20	40	33.33
05-Jul	14	112	60	20	80	71.43
06-Jul	12	96	50	10	60	62.50
07-Jul	14	116	40	15	55	47.41
08-Jul	2	24	23	0	23	95.83
09-Jul	2	28	20	0	20	71.43
10-Jul	2	28	24	0	24	85.71
11-Jul	12	96	14	16	30	31.25
12-Jul	4	32	8	8	16	50.00
TOTAL	301	0	605	356	961	MEAN = 42.04

1/ CPUE=(Catch/Angler Hours)*100

Table 5. Chinook Salmon sportfish catch per unit effort data collected from commercical operator on the Lower-Nushagak River, 1984.

DATE	NUMBER OF FISHERMAN	HOURS FISHED	FISH RELEASED	FISH KEPT	TOTAL CATCH	CATCH PER UNIT EFFORT 1/
16-Jun	3	18	0	0	0	0.00
17-Jun	3	18	0	0	0	0.00
18-Jun	3	18	0	0	0	0.00
19-Jun	3	18	0	0	0	0.00
20-Jun	3	18	0	0	0	0.00
21-Jun	13	74	0	4	4	5.41
22-Jun	24	151	4	25	29	19.21
23-Jun	6	36	12	5	17	47.22
24-Jun	47	309	79	91	170	55.02
25-Jun	28	253	114	56	170	67.19
26-Jun	44	297	235	43	278	93.60
27-Jun	28	207	167	31	198	95.65
28-Jun	35	277	199	38	237	85.56
29-Jun	36	240	40	9	49	20.42
30-Jun	14	108	131	7	138	127.78
01-Jul	27	164	22	32	54	32.93
02-Jul	36	231	35	32	67	29.00
03-Jul	40	247	60	41	101	40.89
04-Jul	25	134	89	11	100	74.63
05-Jul	27	131	63	22	85	64.89
06-Jul	34	252	73	30	103	40.87
07-Jul	14	115	44	7	51	44.35
08-Jul	29	176	8	20	28	15.91
09-Jul	12	82	13	4	17	20.73
10-Jul	2	12	0	0	0	0.00
TOTALS	536	3586	1388	508	1896	MEAN = 39.25

1/CPUE= (Catch/Angler Hours)*100

Figure 4. Chinook salmon catch per 100 angler hours, 1982.

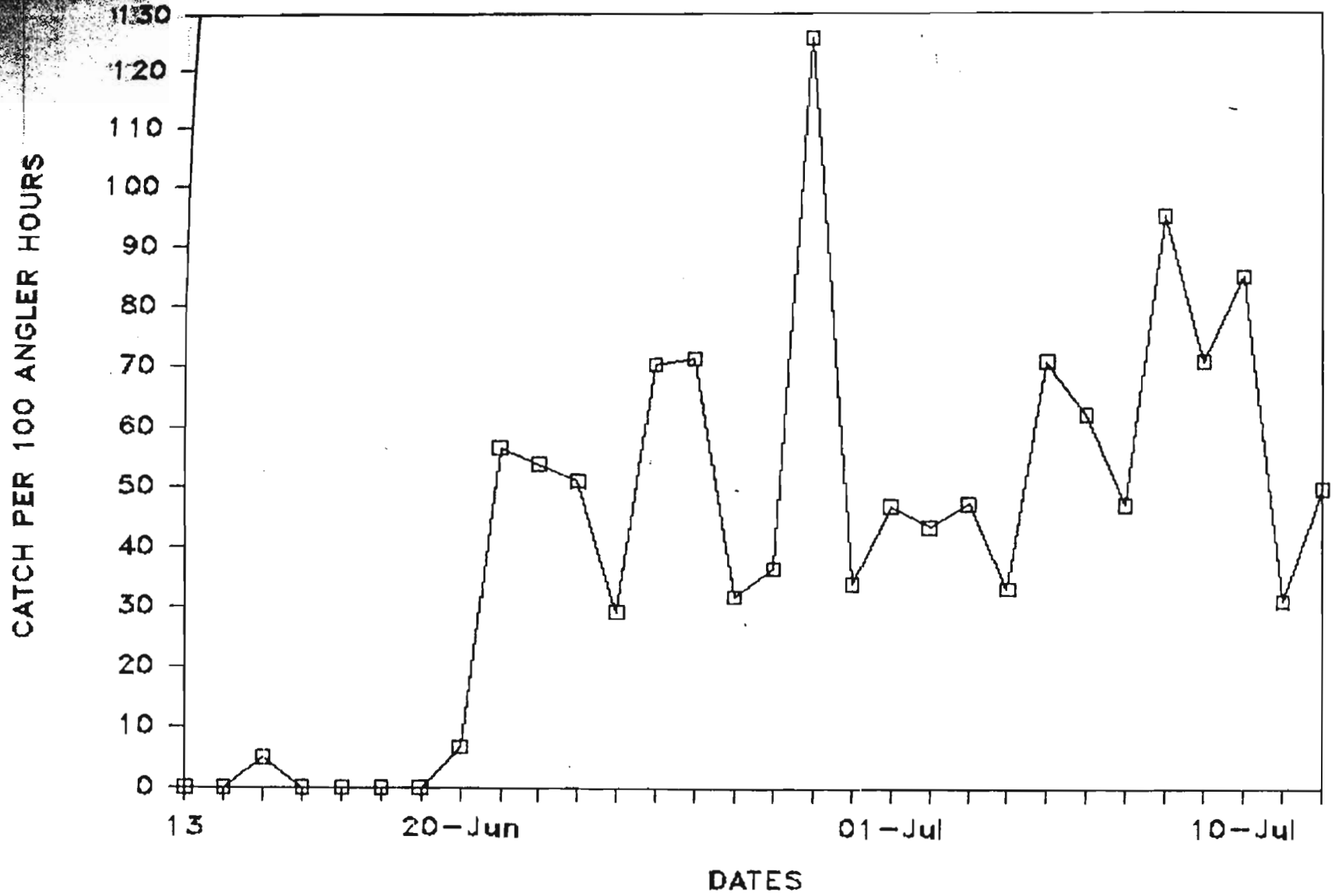


Figure 5. Chinook salmon catch per 100 angler hours, 1984.

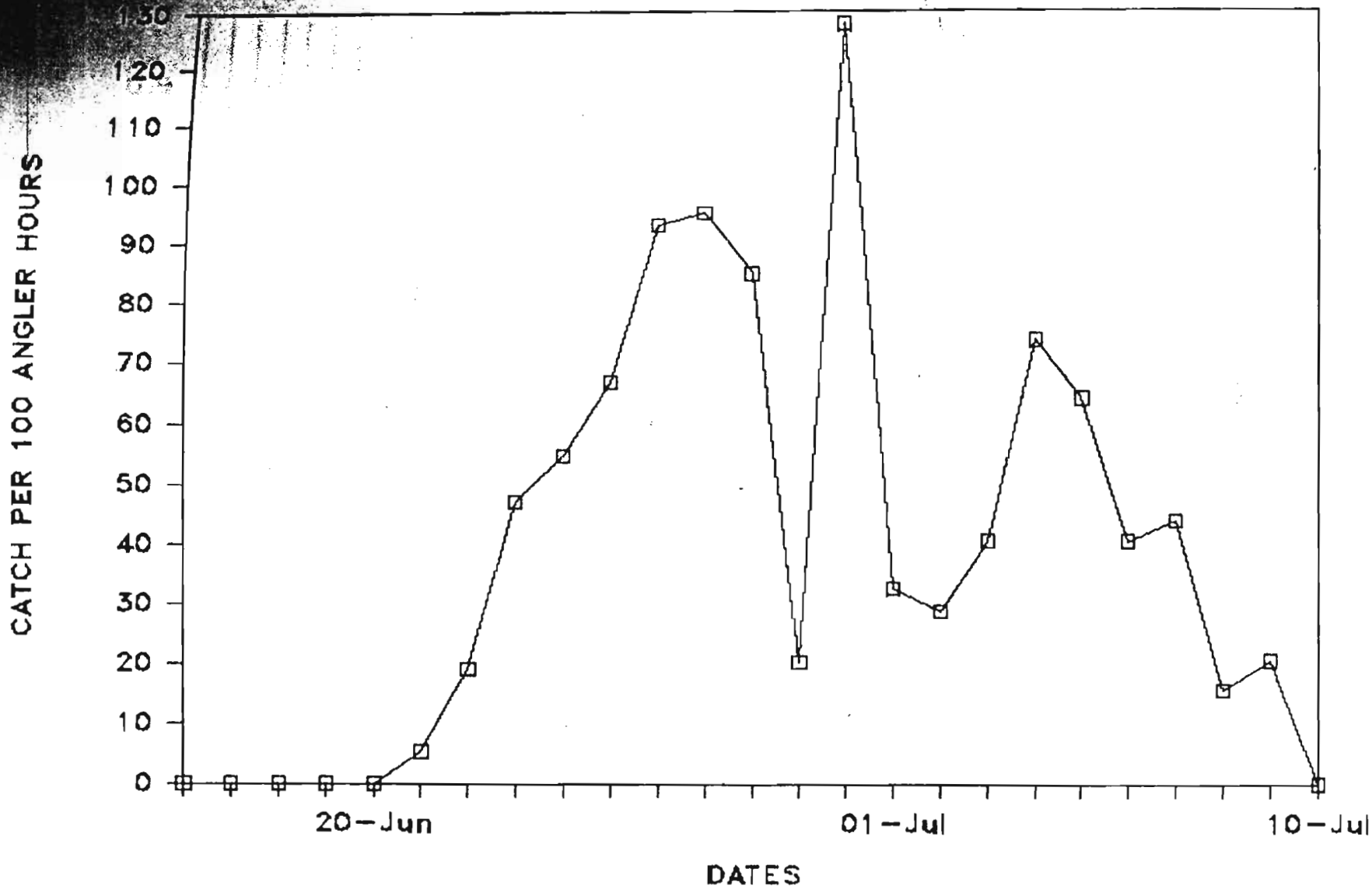
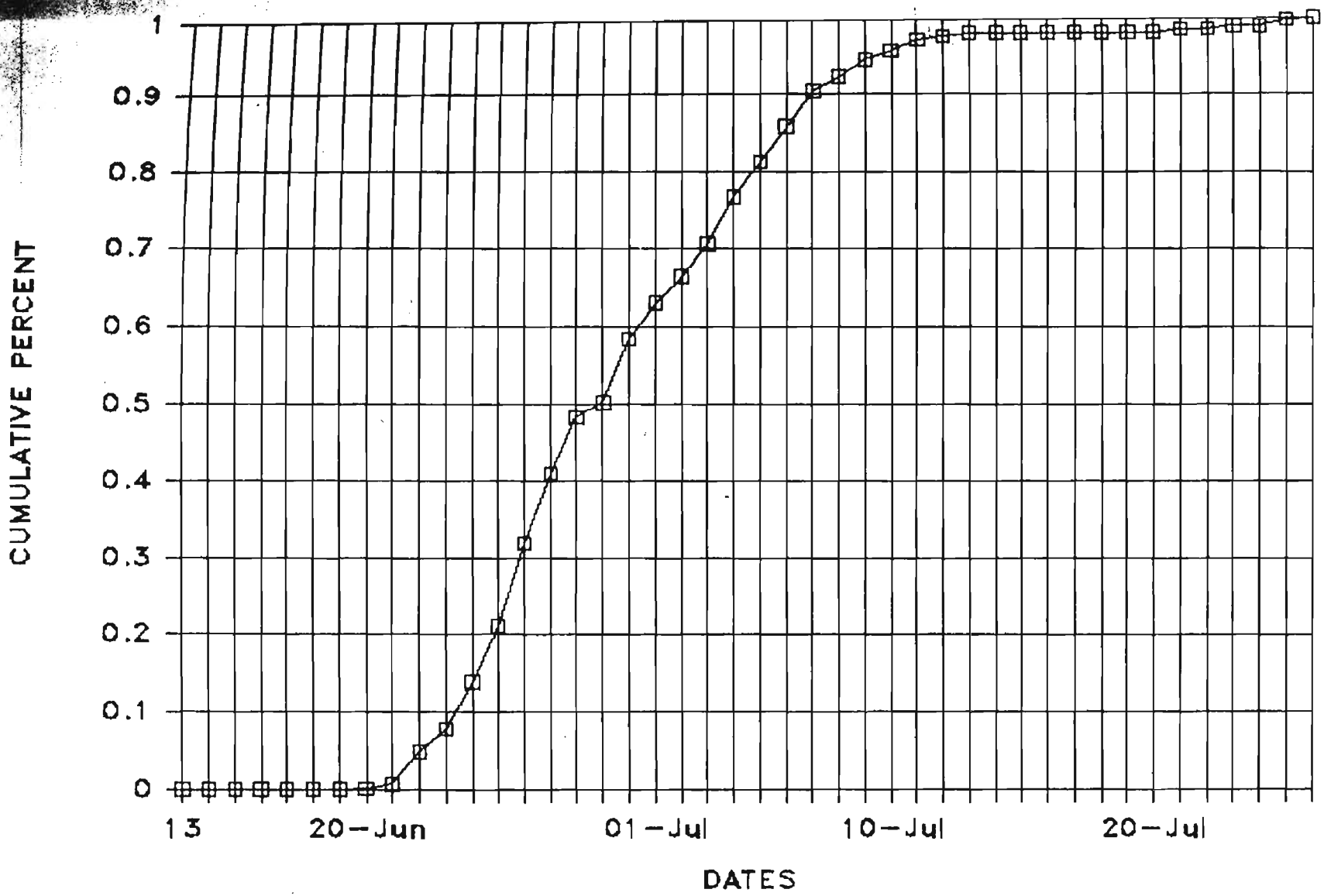


Figure 6. Average chinook salmon cumulative percent catch by day for the lower Nushagak River, 1982 and 1984.



curve given the total catch up to a certain point. These data may also help project escapement levels if sportfishing success is closely correlated with fish abundance.

There is little question that continued work on the sportfishery occurring on the Nushagak River chinook salmon stocks is warranted. Future studies should concentrate on obtaining total harvest estimates by either providing a more comprehensive survey or incorporating some method of defining the proportion of commercial operators that are willing to participate in a survey of this type. Extrapolation of results to account for operators who did not choose to participate would then be possible. A second aspect of the sportfishery that was left unaddressed was the utilization by private non-guided sportsmen. Future studies would certainly do well to address this issue also.